IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Rijks, *et al.*	Docket No.:	EPC-016
Serial No.:	10/537,591	Art Unit:	2836
Filed:	June 6, 2005	Examiner:	Lucy M. Thomas
For:	Driving an Array of Micro-Electro-Mechanical-System (MEMS) Elements		

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

The Applicants wish to bring to the attention of the U.S. Patent and Trademark Office the information noted on the enclosed form. This information may be considered material to the examination of the above-identified application.

This Information Disclosure Statement is submitted after a final rejection. Each item of information contained in this statement was first cited in a communication from a foreign patent office in a counterpart application not more than three months prior to the filing of this statement. For the Examiner's convenience, a translation of the Korean Examination Report is provided herewith.

Please charge the required fee of $180.00 and any additional amount, or credit any overpayment, to Deposit Acct. No. 50-1065 of the below-mentioned firm.

Respectfully submitted,

2/9/2011
Date

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Korean Patent Appln. No. 2005-7010395
Your Ref.: P2008,0377 KR N
Our Ref.: FPL/200503-0135/E/JG

ENGLISH TRANSLATION OF THE NOTICE OF PRELIMINARY REJECTION

Office Action Summary

- ☐ Claims 1 to 12 are pending in the application.
- ☐ The subject application is rejected as below:

No.	Rejected Part	Relevant Provision of the Patent Law
1	The detailed description	Article 42(3)
2	Claims 5 and 12	Article 42(4)(ii)
3	Claims 1 to 12	Article 29(2)

Reasons for Rejection

1. The subject patent application cannot be patented under Article 42(3) of the Korean Patent Law, for the following reason:

   In reference paragraph [0026] of the detailed description (corresponding to pages 22 to 25 of page 6 of the English specification), the expression "The input for a single control voltage is preferably a transistor" is unclear since the input for a single control voltage should be a signal while a transistor is a physical device.

2. The subject patent application cannot be patented under Article 42(4)(ii) of the Korean Patent Law, for the following reason:

   The expression "the input for a single control voltage is a transistor" recited in claim 5 renders the claimed invention indefinite since the input for a single control voltage should be a signal while a transistor is a physical device.

   Claim 12 depending from claim 5 is also unclear.

3. The subject patent application cannot be patented under Article 29(2) of the Korean Patent Law, for the following reasons:

   - Cited reference 1: U.S. Patent No. 4,674,180 (published on June 23, 1987)
   - Cited reference 2: *International Conference on Solid-state Sensors and Actuators, 2001.06., A.C. Wong et al., pages 992-995*

3-1. Claim 1 relates to an electronic device comprising an array of micro-electromechanical system (MEMS) elements, the array providing a plurality of states at its output ("Feature 1"), wherein the MEMS elements each have a first state and a second state, and wherein a transition from the first to the second state is effected by an opening voltage, and a transition from the second to the first state is effected by a closing voltage ("Feature 2"), and that the array comprises an input for a single control voltage that is applied to all the MEMS elements whereby the various states of the array are to be obtained by varying the single control voltage ("Feature 3").

However, Feature 1 corresponds to the micromechanical shunt exhibiting hysteresis disclosed in cited reference 1 (*see* Fig. 1). Furthe, Feature 2 is easily conceivable by those skilled in the art from the relationship between the hysteresis of the shunt device and the voltage applied to the shunt device disclosed in cited reference 1(*see* Fig. 7). Moreover, Feature 3 corresponds to the shunt device using a single voltage disclosed in cited reference 1 (*see* Figs. 11 and 21).

Accordingly, claim 1 is obvious to those skilled in the art over cited reference 1.

3-2. The additional feature of claim 2 is easily conceivable by those skilled in the art from the successive micromechanical shunt circuit element disclosed in cited reference 1 (*see* Figs. 11 and 21).

3-3. The MEMS elements in the array connected in parallel recited in claim 3 corresponds to the series of parallely-connected micromechanical hysteretic shunts disclosed in cited reference 1.

3-4. The additional feature of claim 4 is easily conceivable by those skilled in the art from the number of the shunt device disclosed in cited reference 1 (*see* Figs. 8, 9, 11 and 21).

3-5. The additional feature of claim 5 corresponds to the transistor circuit driving RF MEMS disclosed in cited reference 2 (*see* Fig. 11). Furthermore, it is no more than conventional art that can be easily adopted by those skilled in the art.

3-6. The additional feature of claim 6 corresponds to the voltage applied to a plurality of the shunt devices disclosed in cited reference 1 (*see* Fig. 8).

3-7. Claim 7 recites the features that each of the MEMS elements in the array has a fixed electrode and a movable electrode that is movable towards and away from the fixed electrode by application of the closing and the opening voltage respectively ("Feature a"), that in the first state the distance between the fixed and the movable electrode is smaller than in the second state ("Feature b"), that the movable electrode is suspended substantially parallel to the fixed electrode and anchored to a support structure by at least one cantilever arm having a spring constant ("Feature c"), and that the MEMS element is provided with an actuation electrode with an actuation area for provision of the closing and opening voltage ("Feature d").

However, Feature a corresponds to the cantilever (105) and contact plate (102) disclosed in cited reference 1 (*see* Figs. 5 and 6). Further, Feature b is easily conceivable from the method for driving the cantilever disclosed in cited reference 1. Moreover, Feature c corresponds to the cantilever of cited reference 1. In addition, Feature d corresponds to the electrode terminal and the cantilever disclosed in cited reference 1 (*see* Figs. 1 and 5).

3-8. The additional feature of claim 8 corresponds to the different shapes of cantilevers disclosed in cited reference 1 (*see* Fig. 21).

3-9. Claim 9 recites the features that at least one dielectric layer having a dielectric permittivity is present between the fixed and the movable electrode, such that the MEMS element is a MEMS capacitor, of which capacitor the first state has a first state capacitance ("Feature e"), and that a first and a second MEMS capacitor in the array have different characteristic hysteresis curves in that the first state capacitances of the first and the second MEMS capacitor are different ("Feature f").

However, Feature e corresponds to the capacitance varied by the electrodes (102, 105) disclosed in cited reference 1 (*see* Fig. 2). Further, Feature f is easily conceivable by those skilled in the art from the cantilever electrodes disclosed in cited reference 1 (*see* Fig. 21).

3-10. The additional feature of claim 10 corresponds to the different shapes of cantilevers disclosed in cited reference 1 (*see* Fig. 21).

3-11. The additional feature of claim 11 is easily conceivable by those skilled in the art from the shunt device exhibiting hysteresis disclosed in cited reference 1.

3-12. The additional feature of claim 12 corresponds to the voltage applied to a plurality of the shunt devices of cited reference 1 (*see* Fig. 8).